

# 1995 Toxics Release Inventory for the Department of Defense



## Public Data Report

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### Executive Summary

The Toxics Release Inventory (TRI) is a database which provides information to the public about releases, transfers and management of toxic chemicals.

TRI was established under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and expanded under the Pollution Prevention Act of 1990. Presidential Executive Order 12856, *Federal Compliance with Right-to-Know Law and Pollution Prevention Requirements*, was issued in 1993 and directs all Federal facilities to comply with the reporting requirements.

This report contains TRI data for calendar year 1995, the second reporting year for all DoD installations. DoD submitted this data to the Environmental Protection Agency and the states in August 1996. DoD has 425 major installations in the United States. Of these, 92 installations met the reporting thresholds for the TRI in calendar year (CY) 1995. This represents 39 fewer installations than those reported in CY 1994. Fewer installations reported because DoD pollution prevention efforts eliminated TRI chemical uses altogether and reduced TRI chemical use below reporting threshold levels. The closing of two bases and reduced production also contributed to the decline in the number of installations submitting reports to EPA.

Executive Order 12856 requires federal agencies to reduce their releases and off-site transfers of toxic chemicals by 50% by 1999 from a 1994 baseline. DoD's baseline by which progress is being measured is 10.6 million pounds and includes both on-site releases to air, land, water, and underground injection, as well as off-site transfers for treatment, storage, or disposal.

This baseline is lower than the 11.5 million pound baseline report in March 1996 due to revisions of CY 1994 reports submitted to EPA (see Appendix I for details). The amount of CY 1995 on-site releases and off-site transfers for disposal and treatment is approximately 6.7 million pounds. This 3.9 million pound reduction represents a 36% reduction in the CY 1994 baseline. DoD's strong pollution prevention program and lower production levels contributed to this reduction. Overall, DoD's aggressive programs to reduce the use of toxic chemicals account for the largest percentage of the 3.9 million pound reduction.

## DoD's 1995 Toxics Release Inventory Data

The Toxics Release Inventory (TRI) is a database which provides information to the public about releases of toxic chemicals into the environment.

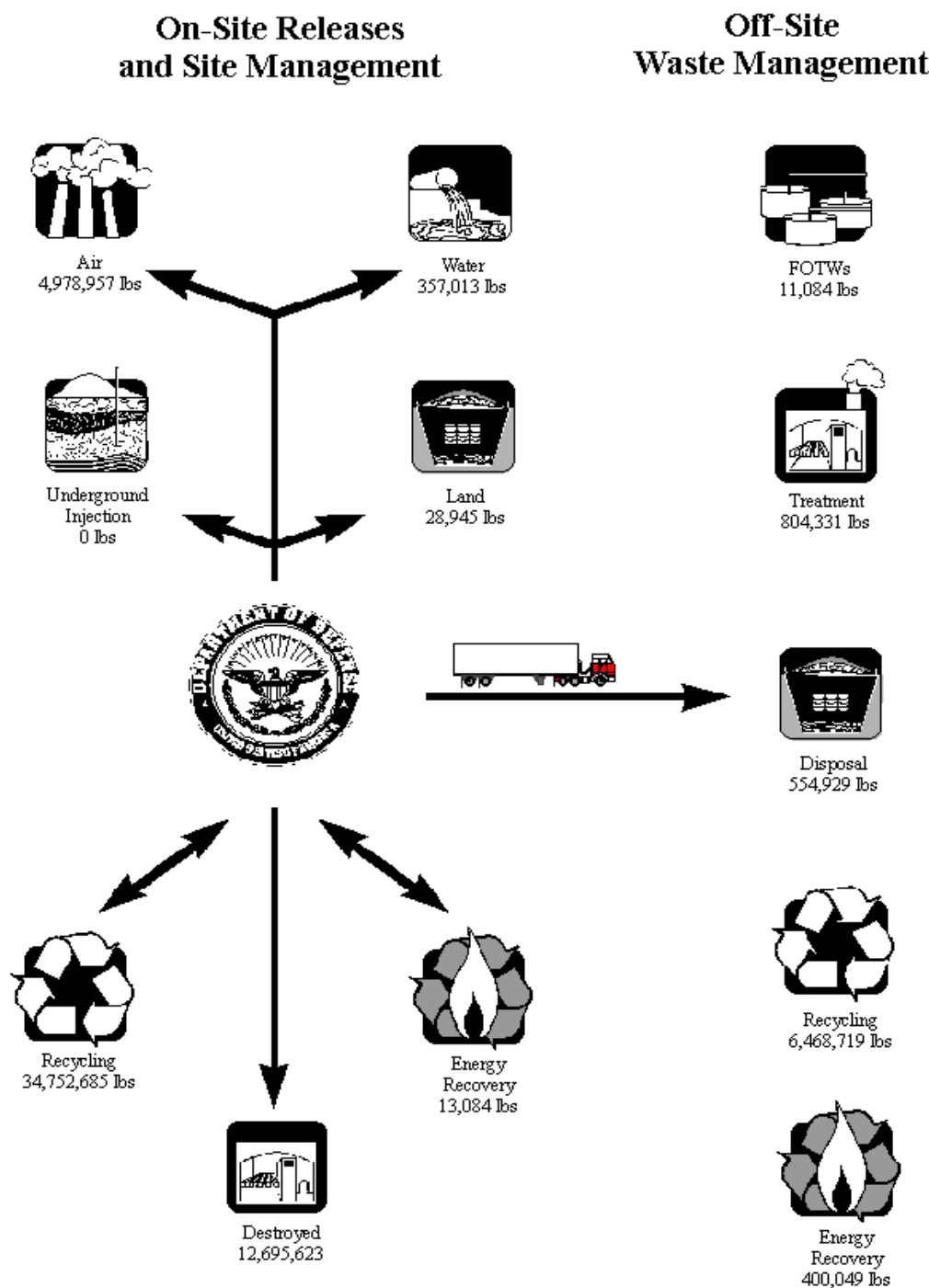
TRI was established under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and expanded under the Pollution Prevention Act of 1990. Presidential Executive Order 12856, *Federal Compliance with Right-to-Know Law and Pollution Prevention Requirements*, was issued in 1993 and directs all Federal facilities to comply with the reporting requirement and established calendar year (CY) 1994 as the first reporting year for most Federal agencies. As required, DoD installations submitted CY 1995 TRI reports to the Environmental Protection Agency (EPA) and the states by August 1, 1996. Installations will submit CY 1996 reports to EPA and the states by August 1, 1997.

EPA issues a Toxics Release Inventory Report each year which provides an overview of the TRI database including information on DoD's TRI data. DoD is providing this more detailed report to inform communities surrounding its installations about the Department's toxic releases and waste management practices. Copies of this report as well the complete DoD TRI database for CY 1994 and CY 1995 are available through the Defense Environmental Network Information Exchange (DENIX) URL: <http://www.denix.osd.mil/>

CY 1995 TRI reporting includes over 600 chemicals and 20 chemical categories. Facilities file a separate reporting form, called a "Form R," for each chemical they manufacture, process, or otherwise use in excess of reporting thresholds. Only those facilities that manufacture or process listed toxic chemicals in excess of 25,000 pounds within one calendar year or otherwise use listed toxic chemicals in excess of 10,000 pounds within one calendar year are required to submit TRI reports to EPA and the states.

The thresholds are chemical-specific and do not apply to the aggregate of all chemicals manufactured or used at a facility. Once a facility meets a threshold for individual toxic chemicals, the facility must submit a TRI Form R report that details the amount of the particular toxic chemical released into the environment. Facilities report the amount released to the air, water, and land, as well as the amounts associated with waste management activities.

Figure 1 shows the amounts and different types of releases, recycling, energy recovery and off-site transfers associated with the Department of Defense's CY 1995 TRI reporting. Appendix I "Explanation of Terms" provides a detailed explanation of what each of the icons in the figure represents.



**Figure 1 CY 1995 TRI Data**

In CY 1995, 92 installations exceeded TRI reporting thresholds for one or more toxic chemicals and filed a Form R for each chemical with EPA and states in August 1996. DoD filed 304 Form Rs for CY 1995. DoD on-site releases to the environment totaled 5.4 million pounds. Of the on-site releases, five million pounds were released to air, 357,000 pounds to water, 29,000 pounds to land. By comparison, private industry on-site releases to the air, water, land and underground injection for the TRI reporting year 1995 were 2.2 billion pounds. Thus, DoD represents a small portion of those total TRI releases, approximately 0.25%.

Of the off-site transfers, 555,000 pounds were managed in a waste disposal facility, 804,000 pounds in a waste treatment facility, and 11,000 pounds in publicly owned treatment works. In addition to these transfers, 6.5 million pounds of TRI chemicals were sent off-site for recycling and 467,000 were sent off for energy recovery.

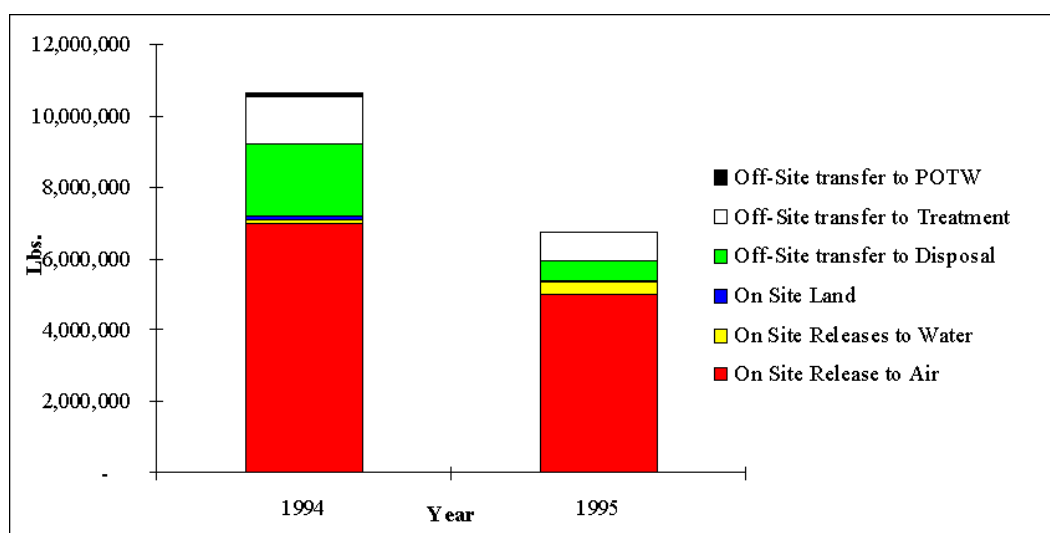
## Executive Order Reduction Program

Executive Order 12856 requires that federal agencies reduce their releases and off-site transfers of toxic chemicals by 50% by 1999 from a 1994 baseline. DoD's baseline by which progress is measured includes both on-site releases to air, land, water, and underground injection, as well as off-site transfers for treatment, storage, or disposal. The actual quantity that is tracked is the sum of the amounts that appear on the EPA Form R section 8.1 (quantity released on site and transferred off-site for disposal) and section 8.7 (quantity transferred off-site for treatment). The President's Order targets onsite releases and transfers off-site for treatment and disposal because these actions most directly affect the environment. The 1990 Pollution Prevention Act (which established section 8 of the Form R) declared the following policy:

- Pollution should be prevented or reduced at the source whenever feasible;
- pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible;
- pollution that cannot be prevented or recycled should be treated in an environmentally safe manner, whenever feasible;
- and, disposal or other release into the environment should be employed only as a last resort.

The four parts of the policy are commonly known as the pollution prevention hierarchy. The goal of DoD's pollution prevention policy and the Executive Order is to encourage DoD installations to move their activities involving pollutants up the hierarchy as much as possible. The ultimate goal of pollution prevention programs is the first element of the hierarchy, source reduction, followed by recycling and reuse being the next acceptable activities to reduce the amounts of pollutants. In descending order from recycling, are treatment, releases and disposal. These last methods do not minimize the generation of waste and thus are the focus of the Executive Order's 50% reduction goal. Throughout this report, when 1994 data is compared to 1995 data the phrase "releases and transfers" will refer to the amount of chemicals released on site and transferred off-site for treatment and disposal (the sum of section 8.1 and section 8.7 of EPA's Form R). **NOTE:** As with any program that measures data over time, the affects from changes in reporting requirements and revisions to data must be analyzed to fully understand the data. See the entry "About the data in this report" in Appendix I for an explanation of what data is being displayed throughout this report.

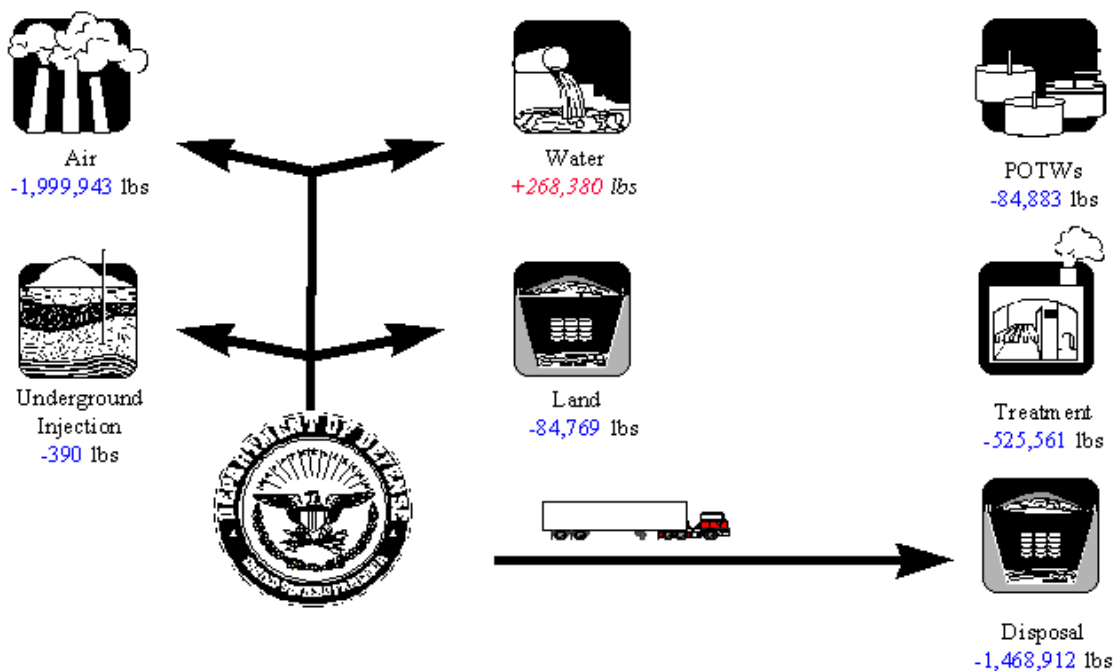
As can be seen in Figure 2, DoD significantly reduced its releases and transfers. DoD's baseline as established by the CY 1994 reports and properly accounting for revisions to 1994 data, delisted chemicals and removal of chemicals added after January 1, 1994 is 10.6 million pounds. The amount of CY 1995 on-site releases and off-site transfers for disposal and treatment is approximately 6.7 million pounds. This represents a 36% reduction in the CY 1994 baseline. Figure 3 provides a comparison of the CY 1994 and CY 1995 baseline and clearly illustrates the elements that comprise the baseline.



**Figure 2 Change in DoD TRI Releases and Transfers 1994 to 1995**

## On-site Releases and Waste Management

## Off-site Waste Management



**Figure 3 Change in DoD TRI Releases and Transfers 1994 to 1995**

### Chemical Distribution of Reductions

The majority of DoD's toxic chemical releases and off-site transfers are accounted for by a limited number of toxic chemicals. DoD's March 1996 Toxic Release Inventory report displayed the top ten chemicals in DoD's baseline. The report noted that these 10 toxic chemicals accounted for 68% of the CY 1994 DoD TRI total. Table 1 tracks reductions made to DoD's top 10 chemicals for CY 1994 with how these same ten chemicals were reported in CY 1995. As shown, DoD has made significant reductions in the use of these top chemicals.

Overall, DoD installations reported on 60 different TRI chemicals in CY 1995. This is a reduction of 14 toxic chemicals from CY 1994. Again, dichloromethane, or methylene chloride, is the most reported chemical. Facilities also reported significant amounts of methyl ethyl ketone (MEK), 1,1,1-Trichloroethane, trichloroethylene, phenol, toluene, tetrachloroethylene, and xylene. Each of these are solvents that are used in a variety of painting, repainting, cleaning, degreasing, and other maintenance operations. In addition, DoD installations reported large amounts of ethylene glycol used as antifreeze, and as a constituent of other materials, and nitrate compounds.

**Table 1 Change in Top 10 Chemical Releases and Transfers Information**

<b>Top 10 1994 Chemical</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
Dichloromethane	2,236	1,617	-28%
Methyl ethyl ketone	1,505	1,097	-27%
1,1,1-Trichloroethane	1,232	751	-39%
Ethylene glycol	537	329	-39%
Toluene	445	235	-47%
Phenol	412	267	-35%
Zinc compounds	409	45	-89%
Tetrachloroethylene	359	217	-39%
Hexachloroethane	351	56	-84%
Hydrochloric acid	298	Delisted	<i>See Appendix I</i>

**Reductions at Individual Installations**

As was the case last year, DoD's large maintenance and depot operations, primarily those engaged in overhauling and repairing aircraft, reported the largest volumes in DoD's releases and transfers. DoD has implemented strong pollution prevention programs at these facilities. Table 2 displays the TRI reductions the Top 10 installations made from 1994 to 1995.

**Table 2 Change in Top 10 Installation Releases and Transfers**

<b>Service</b>	<b>Installation Name</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Percent Change</b>
Air Force	Tinker Air Force Base, OK	1,570	1,081	-31%
Air Force	Robins Air Force Base, GA	777	579	-26%
Army	Pine Bluff Arsenal, AR	726	254	-65%
Air Force	Lockheed-Martin, Marietta, GA (Air Force Plant 6)	555	508	-8%
Army	Anniston Army Depot, AL	528	429	-19%
Navy	Vought Aircraft Company, Dallas, TX	463	470	+1%
Air Force	Hill Air Force Base, UT	368	264	-28%
Air Force	Kelly Air Force Base, TX	343	228	-34%
Air Force	McClellan Air Force Base, CA	341	232	-32%
Navy	Naval Air Station Jacksonville, FL	326	248	-24%

## Reasons for the DoD's TRI Reduction

There are several reasons for DoD's dramatic 36% reduction in its 1995 TRI releases and transfers. First, a portion of the decline can be attributed to a reduction in DoD's size and operations in 1995. The decline in TRI releases and transfers based on reduced activity levels is estimated to be between 850,000 - 2,000,000 pounds. This represents a reduction of between 8% and 19%. Second, DoD's pollution prevention program was responsible for a large portion of the overall reduction (1,350,000 - 2,600,000 pounds). The pollution prevention reduction is estimated to be between 13% and 24% -- a significant achievement.

### Role of Downsizing in E.O. 12856 TRI Releases and Transfer Reductions

Operations and Maintenance Bases and Facilities. In 1995, DoD's major measures of operations tempo were down when compared to 1994 levels. (See Appendix III for details). Flying hours were down 2% and ship steaming hours were down 5%. The number of active duty military personnel was down 6% and total DoD civilian workforce was reduced by 10%. Activity levels at DoD maintenance depots also declined in 1995. The total number of labor hours decreased by 13% and the total amount of materials purchased declined by 6%. These figures indicate that at the DoD-level, aggregate activity level indicators decreased between 2% and 13%. The vast majority of DoD facilities that report TRI data have primary missions that fall within the operations and maintenance area.

Production Facilities. The level of activity at DoD's production facilities (both government-own, government-operated (GOGO) facilities and government-owned, contractor-operated (GOCO) facilities) fluctuate in response to national security needs. Production declines at a few facilities impacted DoD's overall TRI reductions for 1995. The Northrop-Grumman aircraft factory (GOCO) in Bethpage, New York ceased production in 1995. The Bethpage factory accounted for 184,000 pounds of DoD's 1994 releases and transfers. In addition, the Army altered production of munitions in 1995 by mothballing the Kansas City Army Ammunition Plant, Missouri (which had a 1994 baseline of 10,000 pounds). In 1994 and 1995, Pine Bluff Arsenal, Arkansas, received funding to ship some unusable munitions (tank and mortar rounds and grenades) off-site for proper disposal as part of a two year project. More of the munitions were shipped off-site for proper disposal in 1994 than in 1995. Thus, this one time project accounts for the large off-site disposal amount in 1994 and its subsequent drop in 1995. This activity level change explains why TRI data report a 472,000 pound reduction in releases and transfers from Pine Bluff Arsenal from 1994 to 1995. Together, these production and activity declines represent a reduction of 6% from DoD's 1994 baseline (or about 20% of DoD's reduction for 1995).

Taken together, the 2% - 13% reduction in operations and maintenance and the 6% reduction in production facilities account for the overall estimate of 8% - 19% of DoD's reduction being attributable to changes in activity levels.

Base Closures. It has been suggested that base closures might be a good activity level index. After reviewing this, DoD has determined that base closures is not useful measure for evaluating the overall activity levels within the DoD. During the base closure process, some activities are eliminated, but some are transferred to other active installations causing an increase in activity at the new locations. For example, the Navy transferred workload from Alameda Naval Air Station to other installations on the West coast when the Alameda facility closed. Therefore, closing a base does not necessarily mean that the maintenance processes that generated the toxic chemical releases and transfers off-site disappeared from DoD's overall workload. Because of this, the operations and maintenance activity factors listed above are better indicators of activity because they capture transfers of work between installations.

### Role of DoD's Pollution Prevention Program in Releases and Transfers Reduction

While changes in DoD activity levels did contribute to the reduction in DoD's releases and transfers, DoD's pollution prevention program was also responsible for a significant portion of the overall 36% reduction. Large industrial installations such as Tinker and Robins Air Force Base, Jacksonville Naval Air Station, and Barstow Marine Corps Logistics Base achieved significant reductions in their TRI releases and transfers while their production levels remained stable or even increased. Each of these installations have aggressive pollution prevention programs that contributed directly to their TRI reductions. DoD's pollution prevention program has been successful in reducing releases and transfers, because the program had already targeted some of the largest waste streams for reduction. As stated in last year's public data release, 68% of DoD's releases and transfers consisted of DoD's top 10 chemicals and the top 10 installations accounted for 50% of the releases and transfers. DoD's pollution prevention program had already targeted both the bases and the high-use chemicals for elimination and reduction. Several examples of how pollution program goals were translated into specific TRI reductions follow:

#### Fuel changes help reduce DLA releases and transfers 75%

The Defense Logistics Agency reduced its toxic chemical releases and transfers by approximately 75% primarily because the Air Force initiated a program to replace one kind of jet fuel for another mixture that has less environmental impact and does not contain TRI chemicals. The Defense Logistics Agency is the manager for 22 bulk fuel terminals which supply the military with fuel. Because 14 of these facilities processed the old fuel mixture in quantities exceeding the TRI threshold in CY 1994, 14 bulk fuel terminals reported TRI releases. By supplying the new fuel mixture in CY 1995, these facilities did not have to submit TRI reports.

#### Anniston reduces releases and transfers 22% using water rather than chemicals

Anniston Army Depot reduced Trichloroethylene 28% from 204,000 lbs to 147,000 lbs by replacing two vapor degreasers with high pressure washer cleaners, thereby eliminating all off-site transfers of Trichloroethylene for treatment. Overall, Anniston reduced its TRI releases and

transfers 22%.

#### Tinker reduces releases and transfers by 31% through innovation and equipment changes

Like all DoD Installations, Tinker Air Force Base is in the process of implementing a detailed pollution prevention plan that targets TRI chemicals for significant reductions through the application of process changes and new technology. Tinker's plan is particularly detailed and has allowed installation personnel to reduce its releases and transfers 31 percent while production levels remained stable. Here are two specific examples of the reductions Tinker achieved through source reduction:

- The use of innovative technologies as a carbon dioxide blast booth, water jet knife and high pressure aqueous systems to reduce the use of dichloromethane and phenol by 311,000 pounds and 125,000 pounds respectively
- Reducing three TRI chemicals (1,1,1 trichloroethane, tetrachloroethylene, and Freon 113) by 62,000 lbs by replacing chemical cleaning processes with aqueous cleaners

#### Barstow reduces releases and transfers 66% through painting initiatives

Marine Corps Logistics Base (MCLB) Barstow personnel reduced their on-site toxic chemical releases by approximately 54 percent between 1994 and 1995, from 24,570 to 11,299 pounds. This included a reduction of 68 percent of methyl ethyl ketone (MEK) stack air releases (1,506 to 486 pounds), achieved through a combination of painting and repainting-related initiatives. The installation is using improved paint booth technology which reduces emissions from paint overspray, and reformulated and substitute paints containing reduced amounts of toxic chemicals and volatile organic compounds, such as MEK. These reductions occurred while Barstow's production level increased.

#### Mayport replaces equipment to reduce TRI chemicals below reporting thresholds

Mayport Naval Station used a variety of pollution prevention techniques to reduce their overall releases and transfers. This included substituting degreasing equipment with waterbased parts washers. The equipment changes reduced Mayport's toxic chemical use below the 10,000 pound reportable threshold. Therefore, Mayport did not report any toxic chemical releases in 1995.

#### Red River reduces releases and transfers 30% by changing process and materials changes

Red River Army Depot used a variety of process and materials changes to reduce the Methyl Ethyl Ketone (MEK) by 22% and Toluene by 82%. Methods used at Red River include using:

- Water reducible adhesives in rubberizing processes
- High volume low pressure paint guns
- Recycled cleaners for painting and silk screening

Overall Red River personnel achieved a 30% reduction in their releases and transfers .

#### Baking soda helps Robins and Kelly Air Force Bases reduce baseline

Robin's Air Force Base used common baking soda (mixed in with high pressure water known a system known as Bicarbonate of Soda Stripping) to reduce its use of chemical paint strippers to help the base achieve a 26% reduction of its releases and transfers while its production increased. Kelly Air Force Base used bicarbonate of soda to help the installation reduce its releases and transfers by 34%. Equipment changes and improved processes at Kelly also contributed to this reduction.

#### Improved material management and new equipment helps Norfolk reduces TRI 65%

Norfolk Naval Shipyard achieved dramatic reductions of its releases and transfers while its production level declined only 10%. The shipyard achieved the reduction with a combination of equipment purchases, material substitution and process improvements. Environmental personnel facilitated the purchase of new equipment that uses water solutions instead of chemicals to clean and degrease equipment and ship parts. The shipyard also replaced a number of paints with high levels of volatile organic compounds (VOCs) with lower emission paints to greatly reduce the number of TRI chemicals emitted. The shipyard also achieved significant reductions in TRI releases through its consistent use of the Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP). The program limits distribution of hazardous materials to authorized users in small quantities only. Unused material is returned to collection centers for redistribution. These simple management steps greatly reduce the use of hazardous material and worker exposure to the toxic chemicals. CHRIMP is used extensively throughout the Navy.

#### Better materials management helps Ft. Hood reduce its releases and transfers 20%

Through a variety of initiatives, Fort Hood reduced its releases and transfers by 20%. Strict inventory controls and improved management practices that centralized purchase, storage, distribution, and disposal of hazardous materials and toxic chemicals enabled Ft. Hood to reduce its releases and transfers . The centralized management systems such as the one employed by Fort Hood which rely on "just in time"



purchasing and distribution, exact quantity distribution, and distribution to authorized users have reduced waste, liabilities, environmental violations, and costs at numerous DoD installations.

#### Cherry Point reduces releases and transfers 18% through equipment changes

Marine Corps Air Station (MCAS) Cherry Point reduced their toxic chemical releases by approximately 18 percent between 1994 and 1995, from 236,000 to 196,00 pounds. The reductions occurred while production levels remained stable. This included a reduction of 60 percent of dichloromethane fugitive air releases (40,000 to 19,000 pounds). This reduction in dichloromethane releases has been achieved primarily through replacing chemical paint strippers with abrasive blasting equipment.

#### NAS Jacksonville reduces its releases and transfers 24% by replacing equipment

Jacksonville personnel reduced toxic chemical use through a combination of equipment changes and material substitutions. The replacement of large dip tanks that used chemical solutions for cleaning and degreasing operations with smaller water based parts washers reduced the use of chemicals such as 1,1,1 trichloroethane, phenol, Freon 113 and MEK. The Naval Air Station's personnel replaced toxic chemical based strippers with Benzyl alcohol strippers to reduce the use of methylene chloride and phenol. Jacksonville, one of the Navy's key pollution prevention leaders, achieved this reduction despite increased production levels.

## **Appendix I -- An Explanation of Data Displayed and Terms Used**

### **About the Data:**

EPA's Toxic Chemical Inventory reporting program is a constantly evolving program as EPA expands the program to increase the number of chemicals and chemical categories, the type of facilities and the type of information (data elements) that must be reported. All TRI reporters must (including Federal agencies under EO 12856) must report all information required by the TRI program in the year for which the requirements are effective. For example, on November 30, 1994, EPA added approximately 300 toxic chemicals to the TRI list of toxic chemicals. The addition was effective for the 1995 Calendar Year reporting cycle. EPA also responds to petitions from interested parties and periodically removes (delists) or modifies the reporting requirements for toxic chemicals.

In addition to these changes, EPA allows TRI reporting facilities to submit revisions to prior year reports. Historically, the first year of TRI reporting has been difficult for first time reporters. Generally, accuracy improves with the second year of reports and facilities often submit corrections to their first reports.

While it easy to account for these changes when examining the data for the year for which they were effective, properly accounting for the changes must be done carefully when comparing historical data. This is especially true when data is to be compared for the purpose of tracking progress towards achieving a goal such as that contained in EO 12856. As noted in the report, EO 12856 requires federal agencies to reduce the releases and transfers off-site for disposal and treatment of toxic chemicals by 50% by 1999 based on 1994 data. The 1994

### **baseline**

was established as the amount of toxic chemicals accounted for in sections 8.1 and 8.7 of the Form R. As is the case for EPA's voluntary TRI reduction program (known as the 33/50 program), proper adjustments need to be made to limit artificial reductions or increases when examining baseline data.

Therefore, the following applies to the figures and tables in the report:

Figure 1 Calendar Year 1995 TRI Data: All numbers displayed in this chart reflect the aggregate of all data elements that DoD installations were required to be reported for Calendar Year 1995 reports. Figure 1, therefore includes data for the 300 chemicals added by EPA in November 1994. All chemicals that were delisted by EPA up until July 31, 1996, have been removed from this data. This includes hydrochloric acid which was partially delisted (only the aerosol form is reportable) late July 1996. DoD removed hydrochloric acid from its database because it was too difficult to determine at the aggregate level whether the acid was in aerosol form or not. This policy is in line with EPA's 1995 Public Data Release. The figures also include all revisions to individual Form Rs for Calendar Year 1995 that installations submitted to EPA by March 1997.

### Figures 2 and 3 and Tables 1 and 2 Changes in Releases and Transfers:

To ensure accurate tracking of the real progress made in reducing releases and transfers the numbers in these figures and charts reflect the following. First, the 300 Chemicals added to list of chemicals in November 1994 are not tracked when examining progress made against reducing releases and transfers recorded in 1994 because TRI reporters (including DoD installations) were not required to report these chemicals until the Calendar Year 1995 reports. EPA guidance for EO 12856 supports this approach. Second, any chemical EPA delisted up until July 31, 1996 have been removed from the comparison data. The delisted chemicals were removed from both the 1994 and 1995 data to avoid giving DoD installations artificial credit for these delisted chemicals. The figures also include all revisions to individual Form Rs that installations submitted to EPA by March 1997.

**Air Releases.** Releases to air are reported either as stack or fugitive emissions. Stack emissions are releases to air that occur through confined air streams, such as stacks, vents, ducts, or pipes. Fugitive emissions include equipment leaks, evaporative losses from surface impoundments and spills, and releases from building ventilation systems.

**Surface Water Releases.** Releases to water include discharges to streams, rivers, lakes, oceans, and other bodies of water. This includes releases from contained sources, such as industrial process outflow pipes or open trenches. Releases caused by runoff, including stormwater runoff, are also reportable under TRI.

**Land Releases.** Releases to land covered under TRI are those that occur within the boundaries of the reporting facility. Releases to land include disposal of toxic chemicals into landfills, land treatment/application farming (in which a waste containing a listed chemical is applied to or incorporated into soil), surface impoundments (which are uncovered holding areas used to volatilize and/or settle waste materials), and other land disposal (such as spills, leaks, or waste piles).

**Underground Injection.** Underground injection is a contained release of a fluid into a subsurface well for the purpose of waste disposal.

**Recycling.** Toxic chemicals can be either recycled on-site or sent off-site for recycling. The toxic chemicals may be recovered or regenerated by a variety of methods, including solvent recovery, metals recovery, and acid regeneration. Once recycled, these chemicals may be returned to the installation or sold for further processing or use. The quantity reported as on-site recycling in the Form R represents the quantity recovered at the facility, not the quantity that entered the recycling operation. The quantity reported as off-site recycling in the Form R represents the quantity that left the installation boundary for recycling, not the amount recovered at the off-site location.

**Energy Recovery.** Toxic chemicals can be either processed on-site or sent off-site for energy recovery. The toxic chemicals are combusted in industrial furnaces or boilers that generate heat or energy for use at that location. Treatment of a chemical by incineration is not considered to be energy recovery. The quantity reported as on-site energy recovery in the Form R represents the quantity of the toxic chemical that was destroyed in the combustion process, not the amount that entered the energy recovery unit. The quantity reported as off-site energy recovery in the Form R represents the quantity of the toxic chemical that left the installation boundary for recovery, not the amount destroyed at the off-site location.

**Destruction.** Toxic chemicals can be destroyed on-site using a variety of methods. After destruction, no further treatment or transfer to an off-site location is necessary. The quantity reported in the Form R represents the quantity of the toxic chemical that was destroyed in the on-site waste treatment operations, not the amount that entered any treatment operation.

**POTWs.** Toxic chemicals can be transferred off-site to a publicly owned treatment works (POTW). Wastewaters are transferred through pipes or sewers to a POTW. Not all TRI chemicals can be treated or removed by a POTW. The quantity reported in the Form R represents the quantity of the toxic chemical that left the installation boundary for POTW treatment, not the amount that was destroyed at the off-site location.

**Treatment.** Toxic chemicals may be sent off-site for treatment using a variety of methods, including biological treatment, neutralization, incineration, stabilization, and physical separation. These methods result in varying degrees of destruction of the toxic chemical.

**Disposal.** Toxic chemicals sent off-site to a facility for disposal generally are either released to land or injected underground at the off-site location.

## Appendix II -- DoD Component Data

The following pages provide DoD Component specific details on the 1994 DoD baseline. Facilities shown as (GOCO) are government-owned, contractor-operated plants.

### *Army TRI Data*

**Table 1 Change in Top 10 Chemical Releases and Transfers**

Top 10 1994 Chemical	1994 (1,000 lbs)	1995 (1,000 lbs)	Change
Zinc compounds	371	19	-95%
Hexachloroethane	351	56	-84%
Methyl ethyl ketone	231	152	-34%
1,1,1-Trichloroethane	226	137	-39%
Trichloroethylene	214	149	-30%
Dichloromethane	186	150	-19%
Ethylene glycol	121	194	60%
Phosphoric acid	136	48	-65%
Chlorine	67	11	-84%
Ethylbenzene	15	4	-73%

**Table 2 Change in Top 10 Installation Releases and Transfers**

Installation Name	1994 (1,000 lbs)	1995 (1,000 lbs)	Change
Pine Bluff Arsenal, AR	726	254	-65%
Anniston Army Depot, AL	528	429	-19%
Red River Army Depot, TX	118	82	-31%
Letterkenny Army Depot, PA	145	110	-24%
Watervliet Arsenal, NY	135	46	-66%
Holston Army Ammunition Plant, TN	103	322	214%
Lake City Army Ammunition, Plant, MO	84	68	-20%
Rock Island Arsenal, IL	52	15	-72%
Fort Hood, TX	58	46	-21%
Stratford Engineering, Plant, CT (GOCO)	55	23	-58%

## *Navy TRI Data*

**Table 1 Change in Top 10 Chemical Releases and Transfers**

<b>Top 10 1994 Chemical</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
1,1,1-Trichloroethane	596	438	-26%
Dichloromethane	358	245	-32%
Methyl ethyl ketone	288	245	-15%
N-butyl alcohol	184	131	-29%
Nitric acid	161	14	-91%
Xylene (mixed isomers)	130	64	-51%
Freon 113	129	22	-83%
Toluene	92	15	-83%
Hydrochloric acid	48	31	-34%
Phenol	38	0	-100%

**Table 2 Change in Top 10 Installation Releases and Transfers**

<b>Installation Name</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
Vought Aircraft Company, TX (GOCO)	462	470	1%
Naval Air Station Jacksonville, FL	326	248	-24%
Naval Air Station Alameda, CA	228	CLOSED	100%
Norfolk Naval Shipyard, VA	186	66	-65%
Grumman Aerospace Corporation, NY (GOCO)	185	CLOSED	-100%
Norfolk Naval Base, VA	133	75	-44%
Philadelphia Naval Shipyard, PA	129	74	-43%
Puget Sound Naval Shipyard, WA	95	22	-77%
Naval Weapons Industrial Reserve Plant, TX (GOCO)	73	25	-66%
Naval Air Warfare Center, Patuxent River, MD	76	0	-100%

## *Marine Corps TRI Data*

**Table 1 Change in Top 10 Chemical Releases and Transfers**

<b>Top 10 1994 Chemical</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
Ethylene glycol	454	87	-81%
Dichloromethane	156	98	-37%
Methyl ethyl ketone	145	129	-11%
1,1,1-Trichloroethane	76	48	-37%
Toluene	68	53	-22%
Hydrochloric acid	52	Delisted	<i>See Appendix I</i>
Xylene (mixed isomers)	52	37	-25%
Freon 113	35	27	-29%
Glycol ethers	28	47	68%
Chromium	26	12	-59%

**Table 2 Change in Top 10 Installation Releases and Transfers**

<b>Installation Name</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
Marine Corps Logistics Base Barstow, CA	322	88	-73%
Marine Corps Air Station Cherry Point, NC	309	254	-18%
Marine Corps Logistics Base Albany, GA	283	251	-11%
Marine Corps Base Camp Pendleton	216	5	-98%
Marine Corps Blount Island Command, FL	20	0	-100%
Marine Corps Base Camp Lejuene	32	1	-97%
Marine Corps Air Station Yuma, AZ	1	0	-100%
Marine Corps Base Quantico, VA	0	0	0%
Marine Corps Recruit Depot, Parris Island, SC	0	0	0%

## *Air Force TRI Data*

**Table 1 Change in Top 10 Chemical Releases and Transfers**

<b>Top 10 1994 Chemical</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
Dichloromethane	1,535	1116	-27%
Methyl ethyl ketone	841	571	-32%
Phenol	364	235	-35%
Tetrachloroethylene	336	217	-35%
1,1,1-Trichloroethane	367	128	-65%
Toluene	226	133	-41%
Ethylene glycol	162	41	-75%
Hydrochloric acid	162	Delisted	<i>See Appendix I</i>
Chromium compounds	152	57	63%
Glycol ethers	139	30	-78%

**Table 2 Change in Top 10 Installation Releases and Transfers**

<b>Installation Name</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
Tinker Air Force Base, OK	1,570	1,081	-31%
Robins Air Force Base, GA	777	579	-25%
Lockheed-Martin, GA (GOCO)	555	508	-8%
Hill Air Force Base, UT	368	264	-28%
Kelly Air Force Base, TX	345	228	-34%
McClellan Air Force Base, CA	341	232	-32%
Edwards Air Force Base, CA	132	0	-100%
Arnold Air Force Base, TN	154	126	-18%
Hughes Missile Systems, AZ (GOCO)	124	36	-71%
Rockwell International, OK (GOCO)	123	37	-70%

## *Defense Logistics Agency TRI Data*

**Table 1 Change in Top 10 Chemical Releases and Transfers**

<b>Top 10 1994 Chemical</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
Toluene	10.8	0	-100%
Cyclohexane	8	0	-100%
Benzene	6.4	0	-100%
Naphthalene	2.9	0	-100%
Xylene (mixed isomers)	2.6	0	-100%
Methanol	2.4	0	-100%
Bromotrifluoromethane	1.4	3.7	165%
Bromochlorodifluoromethane	1	.4	-26%
Ethylbenzene	.3	0	-100%
Dichlorodifluoromethane	.1	0	-100%

**Table 2 Change in Top 10 Installation Releases and Transfers**

<b>Installation Name</b>	<b>1994 (1,000 lbs)</b>	<b>1995 (1,000 lbs)</b>	<b>Change</b>
Grand Fork Fuel Support Point, ND (GOCO)	10.9	0	-100%
Verona Fuel Support Point, CA (GOCO)	5.5	0	-100%
Charleston Fuel Support Point, SC (GOCO)	4.3	0	-100%
Escanaba Fuel Support Point, CA (GOCO)	2.8	0	-100%
Defense General Supply Center, VA	2.4	5.1	110%
Searsport Fuel Support Point, ME (GOCO)	1.8	0	-100%
San Pedro Fuel Support Point, CA (GOCO)	1.2	0	-100%
Tampa Fuel Support Point, FL (GOCO)	1.2	0	-100%
Melville Fuel Support Point, RI (GOCO)	1	0	-100%
Anchorage Fuel Support Point, AK (GOCO)	1	0	-100%

## Appendix III

Table 1 Key Performance Indicators

Indicator	1994	1995	Change
Active Duty Military EndStrength	1,610,490	1,518,224	-6%
Civilian Personnel Endstreth	376,318	339,360	-10%
Aircraft Inventory	7,078	6,810	-4%
Flying Hours	2,217,000	2,167,000	-2%
Steaming Hours	957,000	907,000	-5%

*Source: DoD Comptroller*

Table 2 Non GOCO Industrial Production Levels

Category	1994	1995	Change
Labor (hours)	121,589	105,272	-13%
Material \$Billion	\$2.331	\$2.182	-6%

*Source: Deputy Under Secretary of Defense for Logistics*